



3.19F Frequency Trees: Foundation Tier Practice

EDEXCEL 1MA1 · Calculator allowed · about 50 minutes

Total Marks

Name: _____ Date: ____ / ____ / ____

Answer ALL questions. Show all your working.

- 1** A school club has 60 pupils. 40 are in the drama group and 20 are not. A frequency tree starts with two branches: Drama and Not drama.
Write down the frequencies for the two branches at the first level of the tree.

(Total for Question 1 is 1 mark)

- 2** A frequency tree shows that of the 40 pupils in drama, 10 are in year 7 and 30 are in year 8.
Work out the probability that a pupil chosen at random is in drama and in year 7.

(Total for Question 2 is 2 marks)

- 3** Complete this step in a frequency tree. There are 60 people. 25 are female and 35 are male. Of the 25 females, 15 like football and 10 do not.
Write down the frequency for females who like football and the probability of picking a female who likes football.

(Total for Question 3 is 2 marks)

- 4** A frequency tree for 80 shoppers starts with two branches: Card payments (50 shoppers) and Cash payments (30 shoppers). Of the card payments, 20 used contactless and 30 used chip and PIN.
Work out the probability that a shopper chosen at random used contactless.

(Total for Question 4 is 3 marks)

- 5** A frequency tree shows the following for 120 people: First branch: Owns a bicycle 72, Does not own a bicycle 48. Of those who own a bicycle, 54 wear helmets and the rest do not. Work out the probability that a person chosen at random does not wear a helmet.

(Total for Question 5 is 3 marks)

- 6** A class of 50 pupils is divided into two groups for a project: Group X has 20 pupils, Group Y has 30 pupils. A frequency tree shows for Group X: 12 completed on time and 8 did not. For Group Y: 21 completed on time and 9 did not.

(a) Complete the tree frequencies. (b) Work out the probability that a pupil chosen at random did not complete on time.

- (a) Complete the missing frequencies on the tree (list the four end frequencies). (1)

- (b) Work out the probability that a pupil chosen at random did not complete on time. (3)

(Total for Question 6 is 4 marks)

- 7** A survey of 200 people produced this partial frequency tree.
First split: Owns a tablet 120, Does not own a tablet 80.
Under Owns a tablet, the split is: Uses it for study 72 and Uses it for games 48.
Under Does not own a tablet, the split is: Uses library 32 and Does not use library 48.
(a) Complete the tree frequencies for all four final branches. (b) Work out the probability that a randomly chosen person uses a tablet for study or uses the library.

(a) List the four end frequencies. (2)

(b) Work out the probability that a person chosen at random uses a tablet for study or uses the library. (3)

(Total for Question 7 is 5 marks)

- 8** A frequency tree for 90 customers begins: Bought tea 54, Did not buy tea 36. Of those who bought tea, 36 also bought biscuits.
(a) Complete the missing frequency for bought tea and did not buy biscuits. (b) Work out the probability that a customer bought biscuits given they bought tea. Give your answer as a fraction.

(a) Write the two frequencies under the 'Bought tea' branch. (2)

(b) Work out the probability that a customer bought biscuits given they bought tea. Give your answer as a fraction in simplest form. (4)

(Total for Question 8 is 6 marks)

9 A school records how pupils travel to school. Out of 150 pupils: Travel by bus 60, Travel by bike 30, Walk 60.

A frequency tree further splits 'Travel by bus' into: Bus with pass 45, Bus without pass 15.

(a) Complete the four end frequencies for all travel types and subtypes. (b) Work out the probability that a pupil chosen at random travels by bike or by bus with a pass.

(a) List the end frequencies for: Bus with pass, Bus without pass, Bike, Walk. (2)

(b) Work out the probability that a pupil chosen at random travels by bike or by bus with a pass. Give your answer as a fraction and as a percentage. (4)

(Total for Question 9 is 6 marks)

10 A charity records donations from 240 people. A frequency tree shows: Donated online 150, Donated in person 90. Of those who donated online, 90 used a one-off donation and 60 set up a monthly donation. Of those who donated in person, 30 were under 25 and 60 were 25 or older.

(a) Complete the tree full frequencies for the four final branches. (b) Work out the probability that a randomly chosen donor is either a monthly online donor or an in-person donor aged 25 or older. (c) A fundraising target needs 96 donors who give monthly online. How many more monthly online donors are needed?

(a) Give the four end frequencies. (2)

(b) Work out the probability that a donor is either a monthly online donor or an in-person donor aged 25 or older. Give your answer as a fraction. (3)

(c) Find how many more monthly online donors are needed to reach the target of 96 monthly online donors. (3)

(Total for Question 10 is 8 marks)

Mark scheme · 3.19F Frequency Trees: Foundation Tier Practice

Question 1

- **B1** 40 and 20 cao
- **Answer: Drama 40, Not drama 20. (frequencies: 40 and 20).**

Question 2

- **M1** use frequency 10 out of total 60 oe
- **A1** $10/60 = 1/6$ cao
- **Answer: $1/6$ (i.e. $10/60 = 1/6$).**

Question 3

- **B1** frequency 15 cao
- **B1** probability $15/60 = 1/4$ cao
- **Answer: Frequency 15. Probability $15/60 = 1/4$.**

Question 4

- **M1** use frequency 20 out of 80 oe
- **A1** $20/80 = 1/4$ cao
- **A1** $1/4$ as a probability or 0.25 or 25% cao
- **Answer: $1/4$ (0.25 or 25%).**

Question 5

- **M1** find frequencies: from owners $72-54 = 18$ not wearing, plus non-owners 48 (assume non-owners do not wear helmets) oe
- **A1** total not wearing = $18 + 48 = 66$ cao
- **A1** probability $66/120 = 11/20$ cao
- **Answer: $11/20$ (0.55).**

Question 6

- (a) **B1** 12, 8, 21, 9 cao
- (a) **Answer: Group X completed 12, not 8; Group Y completed 21, not 9.**
- (b) **M1** add frequencies who did not complete = $8 + 9 = 17$ oe
- (b) **A1** probability $17/50$ cao
- (b) **A1** give fraction simplified or decimal $17/50 = 0.34$ cao
- (b) **Answer: $17/50 = 0.34$.**

Question 7

- (a) **B1** 72, 48, 32, 48 cao
- (a) **B1** their sum 200 or confirmation they match totals oe
- (a) **Answer: 72, 48, 32, 48 (these add to 200).**
- (b) **M1** add frequencies for study (72) and library (32) = 104 oe
- (b) **A1** probability $104/200 = 26/50 = 13/25$ cao
- (b) **A1** give decimal 0.52 or percent 52% cao
- (b) **Answer: $13/25$ (0.52 or 52%).**

Question 8

- (a) **B1** 36 bought tea and biscuits cao
- (a) **B1** $54 - 36 = 18$ bought tea but not biscuits cao
- (a) **Answer: Bought tea and biscuits 36; bought tea and no biscuits 18.**
- (b) **M1** conditional probability 36 out of 54 oe
- (b) **A1** $36/54 = 2/3$ cao
- (b) **A1** show simplest form $2/3$ or equivalent cao
- (b) **A1** explicitly state conditional nature eg $P(\text{biscuits}|\text{tea}) = 2/3$ cao
- (b) **Answer: $2/3$.**

Question 9

- (a) **B1** 45, 15, 30, 60 cao
- (a) **B1** they total 150 oe
- (a) **Answer: Bus with pass 45, Bus without pass 15, Bike 30, Walk 60.**
- (b) **M1** add frequencies $30 + 45 = 75$ oe
- (b) **A1** fraction $75/150 = 1/2$ cao
- (b) **A1** percentage 50% cao
- (b) **A1** state both forms or equivalent decimal 0.5 cao
- (b) **Answer: $1/2 = 50\%$ (0.5).**

Question 10

- (a) **B1** 90 one-off online, 60 monthly online, 30 in-person under 25, 60 in-person 25 or older cao
- (a) **B1** they total 240 oe
- (a) **Answer: Online one-off 90, Online monthly 60, In person under 25 = 30, In person 25 or older = 60.**
- (b) **M1** add frequencies 60 monthly online + 60 in-person 25+ = 120 oe
- (b) **A1** probability $120/240 = 1/2$ cao
- (b) **A1** simplify to $1/2$ and state clearly cao
- (b) **Answer: $1/2$.**
- (c) **M1** calculate shortfall $96 - \text{current monthly } 60 = 36$ oe
- (c) **A1** answer 36 cao
- (c) **A1** state reasoning: need 36 more to reach 96 cao
- (c) **Answer: 36 more monthly online donors are needed.**